



**UNITED STATES DEPARTMENT OF COMMERCE**  
*National Oceanic and Atmospheric Administration*  
**NATIONAL MARINE FISHERIES SERVICE**  
Southwest Fisheries Center  
8604 La Jolla Shores Drive  
La Jolla, California 92038

July 18, 2002

## **CRUISE INSTRUCTIONS**

NOAA Ships: *David Starr Jordan* and *McArthur*

Cruise Number: DS-02-07 and AR-02-07

Cruise Title: Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS)

Study Area: Waters of the Hawaiian Island Chain extending off shore to the limits of the U.S. EEZ  
The study area for this project covers waters from 15°N and 151°W to 32°N and 178°W.

Itinerary: Unless other contingencies arise, afternoon port arrivals and morning departures are assumed.

### *Jordan:*

LEG 1: Depart: 27 Jul – San Diego, CA	Arrive: 15 Aug - Honolulu, HI
LEG 2: Depart: 19 Aug - Honolulu, HI	Arrive: 07 Sep – Midway, HI
LEG 3: Depart: 10 Sep – Midway, HI	Arrive: 29 Sep – Honolulu, HI
LEG 4: Depart: 05 Oct – Honolulu, HI	Arrive: 24 Oct – Honolulu, HI
LEG 5: Depart: 27 Oct – Honolulu, HI	Arrive: 15 Nov – TBD, HI
LEG 6: Depart: 19 Nov – TBD, HI	Arrive: 08 December – San Diego, CA

### *McArthur:*

LEG 1: Depart: 10 Oct – Coos Bay, OR	Arrive: 04 Nov – Hilo, HI
LEG 2: Depart: 08 Nov – Hilo, HI	Arrive: 26 Nov – Honolulu, HI
Transit: Depart: 30 Nov – Honolulu, HI	Arrive: 09 Dec – San Diego, CA
Transit: Depart: 10 Dec – San Diego, CA	Arrive: 14 Dec – Seattle, WA

Sponsoring Institution: NOAA/NMFS  
Protected Resources Division (PRD), Southwest Fisheries Science Center (SWFSC)

Cruise Description and Objectives: The HICEAS 2002 cruise is a marine mammal assessment survey of the waters of the Hawaiian Island Chain extending off shore to the limits of the U.S. Exclusive Economic Zone. The overall objective of the HICEAS cruise is to estimate the abundance and understand the distribution of dolphins and whales which are commonly found in the waters around the Hawaiian Islands. In addition, biological and oceanographic data will be collected to better characterize their environment. Other objectives include biopsy sampling, photo-identification, and acoustic study of sounds produced by Hawaiian cetaceans.



Itinerary: The survey is planned to be a grid of predetermined tracklines to uniformly cover the study area. Proposed tracklines are given in Figure 1. Waypoints will be provided. Tracklines may need to be modified prior to or during the cruise due to weather or other considerations.

Synopsis of Scientific Measurements: Scientists will identify cetacean species and estimate school size and composition, and will also census seabirds and pinnipeds. Physical, chemical, and biological oceanographic data will be collected via net tows and CTDs. Acoustic sampling using a towed hydrophone array and deployed sonobuoys will be conducted. Biopsy sampling and photography will be conducted from the bow or from small boats.

Chief Scientist: Dr. Jay Barlow, SWFSC (858) 546-7178

## OPERATIONS

The following operational plans can be considered as a general guide. Weather, operational and scheduling problems, equipment failures, and other unpredictable events may require that these general operations be modified somewhat. This will occur at the discretion of the Cruise Leader (the Chief Scientist's designee).

### 1.0 DAYLIGHT OPERATIONS

1.1 Cetacean Survey - Line-transect survey methods will be used to collect abundance data. At the beginning of each day search effort should begin on the trackline. The *Jordan* should travel at 9-10 knots (through the water) along the designated trackline. While on search effort, if the ship's speed through the water should deviate from this by more than one knot, the bridge personnel will notify the mammal team on watch or the Cruise Leader. A daily watch for marine mammals will be maintained during daylight hours by scientific observers on the flying bridge (approximately 0600 to 1900), except when the ship has stopped to conduct other sampling operations, or when precluded by weather. A team of three observers will search with 25x150 binoculars, 7X binoculars, and unaided eye. Sighting conditions, watch effort, sightings, and other required information will be entered into a computer, hooked up to the ship's GPS (for course, speed and position information). An "independent observer" may keep a separate watch of animals sighted during the cetacean survey operations, to be compared later with the observer team's data.

1.1.1 Waypoints - Draft waypoints are given in Table 1 and are shown in Figure 1. Points near the coast are approximate, but the actual survey tracklines will end at the 10-fathom isobath (or at the shallowest safe navigation depth as determined by the Commanding Officer). Tracklines into and out of ports are not shown. It is intended that the entire grid of tracklines be covered during the course of the 4-month survey, but the order in which they are covered will be determined by weather and other contingencies. If weather precludes survey, the Cruise Leader may decide to wait at that position for better weather or may direct the ship to another location on the grid based on weather forecasts. The Cruise Leader will be responsible for working with the Command to ensure that the vessel arrives at designated ports at designated times. The Cruise Leader will be responsible for coordinating with the Chief Scientist to ensure that the entire survey grid is uniformly covered and that any gaps that are left can be covered efficiently on later legs. The Cruise Leader may adjust the scientific activities and length of the nighttime travel to meet scientific and scheduling objectives.

1.1.2 Breaking Trackline - On sighting a marine mammal school or other feature of biological interest, the Cruise Leader or marine mammal observer team on watch will request that the vessel be maneuvered to approach the school or feature for investigation. When the ship approaches a group of marine mammals, the observers will make independent estimates of school size. Biopsy and photographic operations may commence from the bow, based on directions from the Cruise Leader or identification specialists. In some instances, the Cruise Leader will request the deployment of a small boat for biopsy, photographic or other operations (see 1.1.6).

It may occasionally be necessary to divert the ship's course from the established trackline during regular effort due to glare or adverse sea conditions. Under these circumstances, the ship may divert up to 30 degrees from the established course. This deviation may continue until the ship is 5 nm from the trackline, at which point the ship should turn back toward the trackline.

1.1.3 Dive-Interval Studies – Sightings of deep-diving whales will prompt dive-interval studies, at the discretion of the Cruise Leader. The collection of dive-interval data is necessary to produce sightability correction factors for those species that spend a considerable amount of time diving. This will help determine how long these species of whales stay under water, for more accurate population estimates. The observer team on watch will start the dive-interval computer program, and will request that the vessel approach the whales targeted for this experiment.

1.1.4 Resuming Effort - When the observers have completed scientific operations for the sighting, the ship will resume the same course and speed as prior to the sighting. If the pursuit of the sighting has taken the ship more than 5 nm from the trackline, the observers should be notified. The Cruise Leader or identification specialists may request that, rather than proceed directly toward the next waypoint, the ship take a heading of 20 degrees back toward the trackline.

1.2 Seabird Survey - Visual surveys of seabirds will be conducted from the flying bridge during daylight hours by two seabird observers. The seabird observers will keep a log of sighting conditions, effort, and sightings as required by the project, on a portable computer with a GPS feed from the unit on the bridge. Seabird observers will occasionally use 25x150 binoculars, but handheld binoculars and unaided eye will be the primary mode of searching.

1.3 Conditions Which Preclude Normal Operations – At times during the cruise visual survey operations will not be possible due to high winds, seas, or fog. Usually, survey operations are suspended at Beaufort Sea State 6 or higher. Also, if fog makes the visibility one nautical mile or less, visual observations are suspended until visibility increases. During these times, the Cruise Leader will decide which task to pursue, if any other operations are possible. The weather conditions that would prevent regular survey operations vary somewhat so the Cruise Leader will inform the bridge when survey effort is suspended.

#### 1.4 Acoustics –

Other - The scientific EK-500 depth sounder will be operated by the oceanographer, at 38 and 200kHz, to estimate micronekton biomass between 0 and 500 m. We request that the EK500 run continuously (day and night). However, this schedule of operation may be changed at the discretion of the Cruise Leader. The vessel's EQ-50 depth sounder may be used at the discretion of the Commanding Officer, but will normally remain off while underway, except when navigating in waters less than 100m. The ship shall inform the Cruise Leader of any use of the vessel's EQ-50, as it interferes with the signals received on the EK-500. The scientific EQ-50 will be used as a backup for the EK-500.

1.4.1 ADCP - The ship's ADCP should run continuously and be logged to a data acquisition system. Complete system settings will be provided by the oceanographer, but will include 5-minute averaging of currents, AGC and 4 beam returns in 60 8-meter bins.

1.4.2 Sonobuoys - Sonobuoys may be deployed periodically from either the *Jordan* or a small boat on an opportunistic basis, at the discretion of the Cruise Leader. With the exception of the small boat, all of the necessary equipment will be supplied and operated by scientists.

1.5 Small Boat Work - A small boat will often be necessary for biopsy sampling and photography. Deployment will be requested by the Cruise Leader on an opportunistic basis, possibly multiple times in a single day, providing the Commanding Officer concurs that operating conditions are safe. The small boat should remain within radar range and radio contact at all times while deployed.

1.5.1 Biopsy Sampling - Biopsies for genetic analyses of marine mammals will be collected on an opportunistic basis. Necessary permits will be aboard the vessel. The animals sampled will either be approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. Samples will be collected from animals within 10m to 30m of the bow of the vessels using a dart fired from a crossbow or a dart rifle. With the exception of the small boat and its requisite safety equipment, all gear will be furnished and deployed by the scientific party.

1.5.2 Photography - Photographs of marine mammals will be taken on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be photographed will either be approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. With the exception of the small boat, all necessary gear will be furnished by the scientific party.

1.6 Collection of Fish - Fish will be collected on an opportunistic basis at the discretion of the Cruise Leader. While underway, trolling gear will be used when conditions permit and if fishing does not interfere with the towed hydrophone array. While stationary, hook-and-line gear will be used. Fish will be measured, sexed, and stomach contents will be examined and recorded by scientific personnel. The Cruise Leader will be responsible for the distribution of the catch, in accordance with NOAA Administrative Order 202-735B, dated January 9, 1989.

1.7 Collection of Marine Mammals - Marine mammal body parts may be collected on an opportunistic basis at the discretion of the Cruise Leader. This includes whale and dolphin ivory and carcasses. In the event that this occurs, scientific freezer space will be needed to store the mammal body parts. Permits to collect and import marine mammal parts will be present on the vessel. All marine mammal ivory collected will be stored at the SWFSC but may be released on extended loan to recognized research institutions according to existing guidelines.

1.8 Oceanography - Oceanographic sampling will be done by the oceanographer and other designated scientists while underway during the day.

1.8.1 XBT Drops - There will be 4 XBT drops per day at 0600, 0900, 1200 and 1500 hours local ship time, and the fourth just prior to the evening net station. If the vessel is stopped, the drop will be done when the vessel is again underway. If the vessel is not going to move within half an hour, the scientist performing the drop should be notified and the drop will be delayed or canceled, at the discretion of the Cruise Leader.

1.8.2 Surface Water Samples - A surface water sample for chlorophyll *a* analysis and a bucket temperature will be taken at 0600, 0900, 1200, 1500, and 1800 hours local ship time daily.

1.8.3 Thermosalinograph Sampling - The ship will provide and maintain a thermosalinograph (TSG), which is calibrated and in working order, for continuous measurement of surface water temperature and salinity. A backup unit (calibrated and in working order) will also be provided by the vessel and remain aboard during the cruise. A data acquisition system (WinDACS), furnished and maintained by scientific personnel, will be connected directly to the TSG output from the Seabird interface box, via a cable with a 9-pin female d-sub connection (provided by ship). This computer (laptop) will receive the raw data, with the NMEA position string attached to each record. Additionally, the laptop will be connected to the ship's LAN, in order to synchronize with the ship's time server. The ship's Scientific Computing System (SCS) shall also collect this information. The oceanographer will provide the ship's Operations Officer and Electronics Technician with detailed acquisition information before departure.

## 2.0 NIGHT OPERATIONS

A chronological record of oceanographic and net tow stations will be kept by the ship (Electronic Marine Operations Log) with dates and times in GMT. The NOAA Ship *David Starr Jordan* will provide a digital copy of the electronic marine operations log and cruise weather log to the SWFSC oceanographer at the completion of the cruise. The main SeaBird CTD system will be provided and operated by the scientific party. The collection of oceanographic data, samples, and their processing will be conducted by the scientific party. The crew of the vessel will operate all deck equipment and be responsible for the proper termination (and any necessary reterminations) of the CTD cable pigtail (provided by the scientific party) to the conducting cable of the winch. The ship shall provide a complete backup system, consisting of frame with weights, 12-place rosette and deck unit, and SeaBird 9/11+ CTD with conductivity and temperature sensors. All instruments, their spares and spare parts provided by the ship must be maintained in working order and, if applicable, have current calibrations (within previous 12 months).

2.1 CTD Stations - One CTD (conductivity-temperature-depth) station will be occupied each evening after sunset. Cast times are subject to change since sunset will vary during the cruise. Additional CTD stations may be requested by the Cruise Leader in areas of special interest. CTD data and seawater samples will be collected using a SeaBird 9/11+ CTD with rosette and Niskin bottles fitted with silicone tubing and o-rings (supplied by oceanographer). All casts are to 1000m (depth permitting) with the descent rate at 30m/min. for the first 100m of the cast, then 60m/min after that, including the upcast between bottles.

2.1.1 CTD Samples - The evening cast (1000 m) will begin approximately one hour after sunset. This exact starting time will be determined in advance, by the FOO or Deck Officer. Niskin bottle water samples will be collected at 12 standard depths between the surface and 1000 meters. From each cast, chlorophyll samples (to 200 m) and salinity samples (500 and 1000 m or bottom) will be collected and processed on board. Additional salt samples will be collected every other day (4 depths < 500m). The 275ml chlorophyll samples will be filtered onto GF/F filters, placed in 10ml of 90% acetone, refrigerated for 24 hours, then analyzed on a Turner Designs model 10AU field fluorometer. Nutrient samples (0 - 500 m) will be collected, frozen, and stored on board.

**Special care must be exercised by the oceanographer and OOD when conducting CTD casts in the vicinity of sea mounts in this region, as the bottom type will often be volcanic rock, and it is possible for the ship drift over an area that is shallower than the cast within the time frame of a typical CTD operation.**

2.2 Dip-net sampling - Concurrent with the evening CTD station, dipnetting for surface fauna will be conducted by scientific personnel. One or more decklights will be necessary to illuminate the water surface in the area of dipnet sampling. Samples will be preserved, labeled, and stored in the vessel's freezer. Scientists may also collect surface fauna for aquaria on board. All live organisms will be donated to the Birch Aquarium upon return to San Diego.

2.3 Net Sampling - Net tows will be conducted by the scientific party with the assistance of a winch operator from the vessel. The schedule for these tows may vary by leg and may need to be modified by the Cruise Leader.

2.3.1 Manta Tow - A surface manta net tow will be conducted for fifteen minutes immediately following the CTD station and dipnetting. Estimated completion time for the entire procedure is 30 minutes. The net should be deployed from the starboard hydrowinch. Samples will be preserved in formalin, labeled, and stored in containers provided by the SWFSC until the vessel returns to San Diego

2.3.2 Bongo Tow - Bongo nets will be towed to a depth of 200m (300 meters of wire out). The bongo tow will take place following the Manta Tow each night. The tow will take approximately 30 minutes to complete.

2.4 Transit - When scientific operations are complete for the night, the ship will resume course and proceed along the trackline, until it is necessary to stop and position the ship for the morning (pre-daylight) CTD station. The Cruise Leader must have the flexibility to determine the transit speed on a daily basis, depending on planned scientific operations.

## **SCIENTIFIC PERSONNEL**

### **CHIEF SCIENTIST**

The Chief Scientist is Dr. Jay Barlow, SWFSC, at phone (858) 546-7178. The Cruise Leader is the authorized representative of the Chief Scientist, with all the designated powers and responsibilities of the Chief Scientist.

The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship, (2) exceed the time allotted for the cruise, (3) result in undue additional expense, or (4) change the general intent of the project.

## PARTICIPATING SCIENTISTS

### **Leg 1 (*Jordan*):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Jay Barlow	Cruise Leader	M/SWFSC
Richard Rowlett	ID Specialist	M/AFL
Juan Carlos Salinas	ID Specialist	M/AFL
Jorge A Del Angel	Mammal Observer	M/AFL
Erin LaBrecque	Mammal Observer	F/AFL
Cornelia Oedekoven	Mammal Observer	F/AFL
Jennifer N. Latusek	Mammal Observer	F/AFL
Brett Jarrett	Seabird Observer	M/AFL
Mike Force	Seabird Observer	M/AFL
Kerry Kopitsky	Oceanographer	F/AFL
Valerie Philbrick	Oceanographer	F/SWFSC
Shannon Rankin	Acoustician	F
Allison Walker	Acoustician	F
Claire Debever	Visiting Scientist	F/Contractor

### **Leg 2 (*Jordan*):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Eric Archer	Cruise Leader	M/AFL
Richard Rowlett	ID Specialist	M/AFL
Juan Carlos Salinas	ID Specialist	M/AFL
Liz Mitchel	Mammal Observer	F/AFL
Erin LaBrecque	Mammal Observer	F/AFL
Cornelia Oedekoven	Mammal Observer	F/AFL
Jennifer N. Latusek	Mammal Observer	F/AFL
Brett Jarrett	Seabird Observer	M/AFL
Mike Force	Seabird Observer	M/AFL
Kerry Kopitsky	Oceanographer	F/AFL
Shannon Rankin	Acoustician	F/AFL
Julie Oswald	Acoustician	F/AFL
	Visiting Scientist	
	Visiting Scientist	



**Leg 3 (Jordan):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Sergio Escorza	Cruise Leader	M/AFL
Richard Rowlett	ID Specialist	M/AFL
Juan Carlos Salinas	ID Specialist	M/AFL
Liz Mitchel	Mammal Observer	F/AFL
Erin LaBrecque	Mammal Observer	F/AFL
Cornelia Oedekoven	Mammal Observer	F/AFL
Jennifer N. Latusek	Mammal Observer	F/AFL
Brett Jarrett	Seabird Observer	M/AFL
Mike Force	Seabird Observer	M/AFL
Kerry Kopitsky	Oceanographer	F/AFL
Shannon Rankin	Acoustician	F/AFL
Tom Norris	Acoustician	M
Hanah Bernard	Visiting Scientist	F/
	Visiting Scientist	

**Leg 4 (Jordan):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Sarah Mesnick	Cruise Leader	F/AFL
Richard Rowlett	ID Specialist	M/AFL
Juan Carlos Salinas	ID Specialist	M/AFL
Liz Mitchel	Mammal Observer	F/AFL
Erin LaBrecque	Mammal Observer	F/AFL
Cornelia Oedekoven	Mammal Observer	F/AFL
Jennifer N. Latusek	Mammal Observer	F/AFL
Brett Jarrett	Seabird Observer	M/AFL
Mike Force	Seabird Observer	M/AFL
Kerry Kopitsky	Oceanographer	F/AFL
Anne Allen	Asst Oceanographer	F/AFL
Shannon Rankin	Acoustician	F/AFL
Jenna Borberg	Acoustician	F/AFL
	Visiting Scientist	

**Leg 5 (Jordan):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Lisa Ballance	Cruise Leader	M/SWFSC
Richard Rowlett	ID Specialist	M/AFL
Juan Carlos Salinas	ID Specialist	M/AFL
Liz Mitchel	Mammal Observer	F/AFL
Erin LaBrecque	Mammal Observer	F/AFL
Cornelia Oedekoven	Mammal Observer	F/AFL
Jennifer N. Latusek	Mammal Observer	F/AFL
Brett Jarrett	Seabird Observer	M/AFL
Mike Force	Seabird Observer	M/AFL
Kerry Kopitsky	Oceanographer	F/AFL
Shannon Rankin	Acoustician	F/AFL
Tony Martinez	Acoustician	M/NMFS
Bob Pitman	Asst Oceanographer	
	Visiting Scientist	

**Leg 6 (Jordan):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Bob Pitman	Cruise Leader	F/SWFSC
Richard Rowlett	ID Specialist	M/AFL
Juan Carlos Salinas	ID Specialist	M/AFL
Liz Mitchel	Mammal Observer	F/AFL
Erin LaBrecque	Mammal Observer	F/AFL
Cornelia Oedekoven	Mammal Observer	F/AFL
Jennifer N. Latusek	Mammal Observer	F/AFL
Brett Jarrett	Seabird Observer	M/AFL
Mike Force	Seabird Observer	M/AFL
Kerry Kopitsky	Oceanographer	F/AFL
Shannon Rankin	Acoustician	F/AFL
Katie Kramer	Acoustician	F
	Visiting Scientist	
	Visiting Scientist	

**Leg 1 (McArthur):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Karin Forney	Cruise Leader	F/NMFS
Jim Cotton	ID Specialist	M/AFL
Jorge A Del Angel	ID Specialist	M/AFL
Susanne Yin	Mammal Observer	F/AFL
Isabel Beasley	Mammal Observer	F/AFL
Susan Rickards	Mammal Observer	F/AFL
Candice Emmons	Mammal Observer	F/AFL
Dawn Breese	Seabird Observer	F/AFL
Sophie Webb	Seabird Observer	F/AFL
	Oceanographer	
	Acoustician	
	Acoustician	
	Visiting Scientist	
	Visiting Scientist	

**Leg 2 & 3 (McArthur):**

<b>Name<sup>1</sup></b>	<b>Position</b>	<b>Sex/Org<sup>2</sup></b>
Tim Gerrodette	Cruise Leader	M/SWFSC
Jim Cotton	ID Specialist	M/AFL
Jorge A Del Angel	ID Specialist	M/AFL
Susanne Yin	Mammal Observer	F/AFL
Isabel Beasley	Mammal Observer	F/AFL
Susan Rickards	Mammal Observer	F/AFL
Candice Emmons	Mammal Observer	F/AFL
Dawn Breese	Seabird Observer	F/AFL
Sophie Webb	Seabird Observer	F/AFL
	Oceanographer	
	Acoustician	
	Acoustician	
	Visiting Scientist	
	Visiting Scientist	

<sup>1</sup> Will be identified by addendum.

<sup>2</sup> Gender required for berthing assignments; organization for logistics and funding.

\*Authorized for per diem at the rate of \$2, for days at sea.

For all legs, the incoming scientific personnel will board the ship on the day of its arrival in port, the outgoing personnel will stay in a hotel or make other plans.

Government ID Cards - Each member of the scientific party will have government ID cards. Foreign nationals will have a copy of their contract or their invitation to sail on the cruise, as well as the required passport and visa.

MEDICAL FORMS - All scientific personnel will complete a NOAA Health Services Questionnaire (NHSQ) prior to embarking, as per NC Instruction 6000.

## **FACILITIES**

### **EQUIPMENT AND CAPABILITIES TO BE PROVIDED BY SCIENTIFIC PARTY**

1. Nine 7x50 hand-held binoculars
2. Four 25x150 binoculars and stands
3. One 20x60 hand-held gyro-stabilized binoculars
4. Three observer chairs for flying bridge
5. Wooden decking for flying bridge
6. Video camera and tapes
7. Three 35mm cameras with lenses, 35mm film, and one digital canon EOS D60
8. Three handheld radios
9. 25-watt marine radio
10. Laptop computer (1) for seabird observers
11. Portable GPS component as backup to ship's system
12. Laptop and label printer (9x11x6 in.) for biopsy samples
13. Crossbows, biopsy darts and tips, sample vials and storage solution
14. Biopsy dart rifle and ammunition (.38 caliber blanks)
15. Formalin, sodium borate, and DMSO
16. Bongo nets (including spare) and frame
17. XBT probes (Deep Blues) – 40 cases (1<sup>1</sup>/<sub>2</sub> pallets)
18. Computers for environmental (WinDACS) and acoustic (ADA) data acquisition
19. SeaBird 9/11+CTD system including G.O. rosette and 1.7L Niskin bottles (15)
20. Fluorometer (TD10AU) and one backup (TD10AU) for discrete chlorophyll *a* analysis
21. Lab apparatus, logs and supplies for discrete chlorophyll *a* analysis
22. Wormley standard seawater vials for salinometer calibration (40 vials)
23. Salinity sample bottles (6 spares)
24. Acetone, hydrochloric acid, Triton x-100
25. Desktop PC with RJ45 KVM extender for remote set up in SIC room
26. Monitor and keyboard for flying bridge to be used in conjunction with SIC remote PC
27. Nutrient sample vials
28. Small refrigerator for chlorophyll sample extraction
29. Bucket thermometer holder and thermometer (and 2 spares)
30. Safety sheets (MSDS's) and clean up materials for all chemicals
31. Oceanographic data logs and log books
32. 2 pallets of sonobuoys (5'x5'x5', 1200 lbs when full)
33. Sonobuoy antenna and coax cable
34. Two sonobuoy receivers
35. DAT recorder for sonobuoys
36. Permits for specimen collection
37. Computer data storage media (diskettes, etc.)
38. 10 reams of paper
39. Winch and cable for towed acoustic array
40. Signal processing and recording system for towed hydrophone array

## EQUIPMENT AND CAPABILITIES TO BE PROVIDED BY SHIP

We request the following systems and their associated support services, sufficient consumables, back-up units, and on-site spares. All measurement instruments are assumed to have current calibrations and we request that all pertinent calibration information be included in the data package.

1. GPS navigation system
2. Power (including 12 V power, if available) and ship's GPS connection (2 feeds) to flying bridge
3. Canopy on flying bridge
4. Three handheld radios (as spares)
5. Small boat for biopsy sampling and photography
6. Freezer space for water and biological samples (-70° freezer and walk-in)
7. Hydrographic winch with minimum 400m cable (1/4" to 3/8" dia.) for net tows
8. Termination for SeaBird CTD cable (including Chinese finger and shackle)
9. Bottom depth checking during CTD casts (PTR or other)
10. Back-up SeaBird 9/11+CTD system and G.O. rosette, frame with weights, spare 1.7L Niskins (12)
11. Oceanographic winch with 5/16" conducting wire
12. SeaBird thermosalinograph (SBE21) and connection (9-pin female D-sub for WinDACS)
13. SEAS system
14. Storage space on aft deck for 45 boxes of XBTs in 2 fish boxes 48"x44"x30", and 27 in aft lab.
15. Scientific Computing System for data collection (redundant to WinDACS system)
16. Simrad EK-500 scientific sounder and data recording system
17. Simrad EQ50 echo sounder w/TVG and synch outputs from both 38 and 200 kHz
18. Salinity sample bottles (48 ea. - 2 cases of 24 plus spares)
19. Hook up and space in SIC room and on flying bridge for fly bridge remote PC and local monitor (incl. Gps feed to PC)
20. Hook-up (CTD) and counter space for SWFSC-supplied oceanographic computer
21. Deck space for one bongo net frame (pair of nets attached).
22. RDI 150-kHz ADCP and data acquisition system.
23. Marine Operations and Deck Log (electronic)/Weather Observation sheets, filled out by Deck Officers
24. Installation of SWFSC-supplied sonobuoy antenna and coax cable
25. Exterior storage space for 2 pallets of sonobuoys (see item 52 above)
26. Copy Machine
27. Additional email computer for scientific email use in Chem Lab.
28. Deck space and hydraulic hookup for acoustic winch
29. LAN connection to main lab (4) and 1 to flying bridge (to be used for time server)

## INSTALLATION AND MAINTENANCE

Prior to departure from San Diego, the Chief Scientist and members of the scientific party may board the vessel, with permission of the Commanding Officer, to test survey equipment and environmental sensors, load and set up equipment, and assemble and modify wooden decking on flying bridge. Loading and set up is currently planned for the 23<sup>rd</sup> through 26<sup>th</sup> of July.

During the cruise, the temperature of the scientific freezer and refrigerator must be monitored by the ship's engineering staff twice daily, and the Cruise Leader notified in the event of significant changes.

## HAZARDOUS MATERIALS

The Chief Scientist shall be responsible for complying with NC Instruction 6280a, Hazardous Materials and Hazardous Waste; policy, guidance, and training, dated February 4, 1991, paragraph 7.g

and paragraph 9. By Federal Law, the ship may not sail without a complete inventory of Material Safety Data Sheets (MSDS's) and appropriating neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemicals brought on board. The Chief Scientist will provide the Commanding Officer with a copy of all MSDS's prior to the cruise.

## **DATA RESPONSIBILITIES**

Collection of Data - The Chief Scientist will receive all original data related to the project, and this data transfer will be documented on NOAA Form 61-29, "Letter Transmitting Data". The Chief Scientist will in turn furnish the Commanding Officer with a complete inventory listing of all data gathered by the scientific party, detailing types of operations and quantities of data prior to departing the ship. All data gathered by the vessel's personnel that are desired by the Chief Scientist will be released to him, including supplementary data specimens and photos gathered by the scientific crew.

Dissemination of Data - The Chief Scientist is responsible for the quality assurance, disposition, and archiving of data and specimens collected aboard the ship. The Chief Scientist is also responsible for the dissemination of copies of these data to cruise participants and to any other requesters. The SWFSC cruise report will be submitted according to SWFSC procedures to appropriate persons and groups.

Evaluation Form - The Chief Scientist will complete the Ship Operations Evaluation Form and forward it to the Office of Marine and Aviation Operations. The Commanding Officer will provide this form.

## **ADDITIONAL INVESTIGATIONS AND PROJECTS**

Ancillary Projects - Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force. Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions. Any additional work will be conducted so as not to interfere with operations as outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the primary project with approval from the Commanding Officer.

## **COMMUNICATIONS**

Radios - The Cruise Leader or designee may request, from the Commanding Officer, the use of radio transceivers aboard the ship to communicate with other vessels and aircraft, if necessary.

SWFSC will supply their own handheld radios for intraship communication and communication with the small boats. However, the Cruise Leader may request the use of the ship's handheld radios if the supplied radios should fail.

A 25 watt Marine Radio with antenna will be mounted on the flying bridge for ease of communication with small boat.

Telephone - The Cruise Leader or designee may require access to the ship's INMARSAT or cellular telephone systems with permission from the Commanding Officer. The Commanding Officer will provide the Cruise Leader with a log of all INMARSAT calls made from the ship for SWFSC business at the end of each leg. In accordance with the Communications Reimbursement Policy dated April 26, 1999, SWFSC will pay these charges via a transfer of funds from SWFSC to the ship.

Electronic Mail - All members of the scientific party will have access to e-mail for communications with persons not aboard the ship. The amount of such communication traffic will be determined by the Chief Scientist.

Routine Reports - The Cruise Leader will submit a weekly cruise report, along with time and attendance for the scientific party, to the Survey Coordinator each Thursday during the cruise via cemail or, if cemail is not functioning properly, via fax. The Survey Coordinator at SWFSC will be on the distribution list for the ship's noon position reports.

## **MISCELLANEOUS**

Precruise Meeting - A precruise meeting between the Chief Scientist (and his staff) and the Commanding Officer (and his staff) will be held prior to the start of the cruise to identify operational requirements (*i.e.* overtime, modifications, repairs, or procurements). This meeting is scheduled for July 19<sup>th</sup> at 0900.

Underway Meetings - Meetings between the Commanding Officer (and other officers) and the Cruise Leader should occur at the end of each leg to discuss and solve any problems or changes that may arise. Additional meetings should occur as needed during the leg.

Debrief - A postcruise debriefing will be held between the Chief Scientist and the Commanding Officer. If serious problems are identified, the Commanding Officer shall notify the Marine Operations Center, Pacific, in the most direct means available. The Chief Scientist shall document identified problems in the Ship Operations Evaluation Form. The time and date for the debrief will be determined toward the end of the cruise.

Time and Attendance - Time and Attendance will be filled out by the SWFSC timekeeper while the ship is at sea, based on information transmitted by the Cruise Leader to the Survey Coordinator. Scheduled overtime is authorized for Saturdays, Sundays and holidays. Irregular overtime will be authorized by the Cruise Leader as required. SWFSC personnel are authorized per diem at the rate of \$2.00 to be paid via a travel voucher at the termination of the cruise. Task Number FR7200 8L4S0D 21 will pay for per diem and overtime for Cruise Leaders and other SWFSC personnel. Regular salary for SWFSC personnel will be paid by the CYOP task from which they are normally paid.

Navigation - Primary control will be GPS, also dead reckoning based on visual bearings and radar ranges when possible.

Scientific Spaces - The Cruise Leader shall be responsible for the proper upkeep and cleaning of all spaces assigned to the scientific party, both laboratory and living spaces, throughout the cruise. The Cruise Leader or Chief Scientist will make berthing assignments for scientific personnel on a per-leg basis, with approval of the Commanding Officer.

Prepared by: \_\_\_\_\_  
LTJg Jason Appler  
Survey Coordinator, SWFSC

Dated: \_\_\_\_\_

\_\_\_\_\_  
Dr. Jay Barlow  
Chief Scientist, SWFSC

Dated: \_\_\_\_\_

Approved by: \_\_\_\_\_  
Dr. Michael Tillman,  
Science Director, F/SWR

Dated: \_\_\_\_\_



Tracklines:

There are a total of 13 transectional lines running along a bearing line of 285/105, and intersecting points located 48 degrees apart on longitude 165 West as follows:

28° 03.0' N  
27° 15.0' N  
26° 27.0' N  
25° 39.0' N  
24° 51.0' N  
24° 03.0' N  
23° 15.0' N  
22° 27.0' N  
21° 39.0' N  
20° 51.0' N  
20° 03.0' N  
19° 15.0' N  
18° 27.0' N

The survey tracklines are that portion of the transectional lines which fall within the United States' Exclusive Economic Zone of the Hawaiian Islands.